IN THE CLAIMS

What is claimed is:

1. A slurry comprising:

an abrasive; and

periodic acid, wherein the pH of the slurry is between about 4 to about

2. The slurry of claim 1 further comprising a corrosion inhibitor.

3. The slurry of claim 2 wherein the corrosion inhibitor comprises 1-benzotriazole (BTA).

4. The slurry of claim 1 further comprising a buffer system comprising an organic acid and a salt of the organic acid.

5. The slurry of claim 4 wherein the organic acid is selected from the group comprising citric acid, acetic acid, carbonic acid, oxalic acid and ascorbic acid.

6. The slurry of claim 1 wherein the salt of the organic acid is selected form the group comprising potassium citrate, potassium acetate, potassium bicarbonate, potassium oxalate and potassium ascorbate.

7. The slurry of claim 1 wherein the periodic acid comprises a molar concentration from about 0.005M to about 0.05M.

8. The slurry of claim 1 wherein the abrasive is selected from the group comprising silica, alumina, zirconia and ceria.

9. The slurry of claim 1 further comprising a surfactant.

10. The slurry of claim 9 wherein the surfactant is selected from the group comprising cetyl trimethyl ammonium hydroxide (CTAOH).

11. A method of forming a microelectronic structure comprising:

providing a substrate comprising a barrier layer disposed on an adhesion layer, wherein the adhesion layer is disposed within a recess and on a first surface of a substrate; and

removing the barrier layer from the adhesion layer with a slurry comprising periodic acid and a pH from about 4 to about 8.

12. The method of claim 11 wherein providing a substrate comprising a barrier layer comprises providing a substrate comprising a material selected form the group comprising ruthenium oxide, ruthenium, rhenium, rhodium, palladium, silver, osmium, iridium, platinum, and gold and combinations thereof.

13. The method of claim 11 wherein removing the barrier layer from the adhesion layer with a slurry comprising periodic acid and a pH from about 4 to about 8 comprises removing the barrier layer from the adhesion layer with a slurry comprising periodic acid at a molar concentration from about 0.01M to about .06M, and a pH from about 4 to about 8.

14. The method of claim 13 wherein removing the barrier layer from the adhesion layer with a slurry comprises removing a ruthenium oxide layer from the adhesion layer with a slurry at a removal rate of about 900 angstroms per minute to about 1500 angstroms per minute.

15. The method of claim 11 wherein providing a substrate comprising a barrier layer disposed on an adhesion layer, wherein the adhesion layer is disposed within a recess and on a first surface of a substrate comprises providing a substrate comprising a metal layer disposed on a barrier layer that is disposed on an adhesion layer, wherein the adhesion layer is

disposed within a recess and on a first surface of a substrate.

16. The method of claim 15 wherein removing the metal layer from the barrier layer comprises removing a copper layer from the barrier layer.

17. The method of claim 16 further comprising removing the copper layer from the barrier layer with a slurry at a removal rate of about 250 angstroms per minute to about 800 angstroms per minute.

18. The method of claim 11 wherein removing the barrier layer from the adhesion layer with a slurry comprising periodic acid and a pH from about 4 to about 8 comprises removing the metal layer from the adhesion layer with a slurry comprising periodic acid at a molar concentration from about 0.004M to about .006M, and a pH from about 4 to about 8.

19. The method of claim 18 wherein removing the barrier layer from the adhesion layer with a slurry comprises removing a ruthenium layer from the adhesion layer with a slurry at a removal rate of at least about 1000 angstroms per minute.

20. The method of claim 11 wherein providing a substrate comprising a barrier layer disposed on an adhesion layer, comprises providing a substrate

comprising a barrier layer disposed on a material selected from the group consisting of titanium, titanium nitride, tantalum, tantalum nitride and combinations thereof.

21. A method of forming a microelectronic structure comprising:

providing a substrate comprising a recess wherein a work function layer is disposed within the recess and on a first surface of the recess, and wherein a fill metal layer is disposed on the work function layer; and

forming a metal gate electrode by:

removing the fill metal layer until the underlying work function layer is exposed by utilizing a slurry comprising periodic acid at a pH from about 4 to about 8; and

removing the work function layer from the first surface of the recess with the slurry.

22. The method of claim 21 wherein removing the fill metal layer comprises removing the fill metal layer by utilizing chemical mechanical polishing.

23. The method of claim 21 wherein removing the work function layer comprises removing the work function layer utilizing chemical mechanical polishing.

24. The method of claim 21 wherein providing a substrate comprising a recess wherein a work function layer is disposed within the recess comprises providing a substrate comprising a recess wherein a work function layer selected from the group comprising ruthenium, ruthenium oxide, titanium nitride, titanium, aluminum, titanium carbide, aluminum nitride, and combinations thereof is disposed within the recess.

25. The method of claim 21 wherein providing a substrate comprising a recess wherein a work function layer is disposed within the recess and on a first surface of the recess comprises providing a substrate comprising a recess wherein a work function layer includes a sufficient amount of an impurity to shift the work function of the work function layer by at least about 0.1 eV.

26. The method of claim 25 wherein providing a substrate comprising a recess wherein a work function layer includes a sufficient amount of an impurity comprises providing a substrate comprising a recess wherein a work function layer includes a sufficient amount of an impurity selected from the

group consisting of a lanthanide metal, an alkali metal, an alkaline earth metal, scandium, zirconium, hafnium, aluminum, titanium, tantalum, niobium, tungsten, nitrogen, chlorine, oxygen, fluorine, and bromine.

27. The method of claim 21 wherein the metal fill layer is selected from the group consisting of copper, titanium, titanium nitride, tungsten and combinations thereof .

28. The method of claim 21 wherein removing the work function comprises removing the work function layer by utilizing a slurry comprising periodic acid at a pH from about 4 to about 8 at a molar concentration from about 0.01M to about .06M.

29. The method of claim 28 wherein removing the work function layer comprises removing a ruthenium layer at a removal rate of about 900 angstroms per minute to about 1500 angstroms per minute.

30. The method of claim 28 wherein removing the work function layer comprises removing a titanium nitride, aluminum nitride layer at a removal rate of about 500 angstroms per minute to about 700 angstroms per minute.

31. The method of claim 28 wherein removing the work function layer

comprises removing a titanium aluminum layer at a removal rate of about 150 angstroms per minute to about 350 angstroms per minute.

32. A metal gate structure comprising:

a dielectric layer;

a work function layer, wherein the work function layer includes a sufficient amount of an impurity to shift the workfunction of the work function layer by at least about 0.1 eV; and

a metal fill layer comprising copper.

33. The structure of claim 32 wherein the work function layer comprises ruthenium, titanium nitride, titanium, aluminum, titanium carbide, aluminum nitride, and combinations thereof.

34. The structure of claim 32 wherein the impurity is selected from the group consisting of a lanthanide metal, an alkali metal, an alkaline earth metal, scandium, zirconium, hafnium, aluminum, titanium, tantalum, niobium, tungsten, nitrogen, chlorine, oxygen, fluorine, and bromine.

35. The structure of claim 32 wherein the dielectric layer comprises a high k dielectric layer selected from the group consisting of hafnium oxide, hafnium silicon oxide, lanthanum oxide, zirconium oxide, zirconium silicon

oxide, titanium oxide, tantalum oxide, barium strontium titanium oxide, barium titanium oxide, strontium titanium oxide, yttrium oxide, aluminum oxide, lead scandium tantalum oxide, and lead zinc niobate.